FEB 6 1980

EXHIBITS

IN THE

Supreme Court of the United States

OCTOBER TERM 1979

No. 79-669

DAWSON CHEMICAL COMPANY,
CRYSTAL MANUFACTURING CORPORATION AND
CRYSTAL CHEMICAL COMPANY

Petitioners,

v.

ROHM AND HAAS COMPANY,

Respondent.

ON WRIT OF CERTIORARI TO THE
UNITED STATES COURT OF APPEALS
FOR THE FIFTH CIRCUIT

PETITION FOR CERTIORARI FILED OCTOBER 24, 1979
CERTIORARI GRANTED JANUARY 7, 1980

IN THE

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United States Patent [19]

Wilson et al.

[11] **3,816,092**

[45] **June 11, 1974**

[54] HERBICIDAL 3,1-DICHLOROANILIDES

[75] Inventors: **Harold F. Wilson**, Moorestown, N.J.; **Dougal H. McRay**, Hatboro, Pa.

[73] Assignee: **Rohm & Haas Company**, Philadelphia, Pa.

[22] Filed: **Mar. 16, 1961**

[21] Appl. No.: **96,089**

Related U.S. Application Data

[60] Division of Ser. No. 31,253, May 24, 1960, abandoned, which is a continuation-in-part of Ser. No. 714,947, Feb. 13, 1958, abandoned.

[52] U.S. Cl. 71/118
[51] Int. Cl. A01n 9/20
[58] Field of Search 71/2.3, 118; 260/562

[56] **References Cited**

UNITED STATES PATENTS

2,849,465 8/1958 Randall et al. 260/562

FOREIGN PATENTS OR APPLICATIONS

1,005,784 9/1957 Germany 71/118

OTHER PUBLICATIONS

Plant Regulators, CDCC Positive Data Series, No. 2, June 1955, National Research Council, Pages a, b, c, 1, 39 & 40.

King, Insecticides and Repellents, Agri. Handbook, No. 69, Page 285, USDA, (1954).

Reilstein Handbuch der Organischen Chemie, Vol. 12, 4th Edition, Pages 622–629.

Takematsu et al., Fundamental Studies Relating to Control of Weeds in Farm Land, 1/1959.

Primary Examiner—James O. Thomas, Jr.
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[57] **ABSTRACT**

Disclosed is a method for selectively inhibiting growth of undesirable plants in an area containing growing undesirable plants in an established crop, which comprises applying to said area 3,4-dichloropropionanilide at a rate of application which inhibits growth of said undesirable plants and which does not adversely affect the growth of said established crop.

12 Claims, No Drawings

HERBICIDAL 3,1-DICHLOROANILIDES

This application is a division of application Ser. No. 31,253, filed May 24, 1960, which, in turn, was a continuation-in-part of Ser. No. 714,947, filed Feb. 13, 1958, both now abandoned.

This invention deals with the 3,4-dichloroanilides of propionic, isobutyric, and also α-methylvaleric acids. It has been discovered that these compounds possess marked herbicidal activity. Of these three new compounds, 3,4-dichloropropionanilide is outstandingly active, and while the other two anilides are somewhat less potent as herbicides, they nevertheless exhibit an unexpected level of such activity. There are other secondary differences which will be discussed below.

During the past years, there has been an intensified search for weedicides and herbicides. While various useful substances have been developed, there is still need for agents which have a better balance of properties or which exhibit special properties. For example, most of the currently utilized herbicides are primarily effective against dicotyledonous plants. Some compounds are highly toxic to all types of plants and thus lack the selectively and differential characteristics which are necessary for many applications. In meeting such needs, the present compounds provide a significant advance. The chemical literature contains reference to a number of monochloroanilides of monocarboxylic acids and also to 2,4-dichloropropionanilide. Shaw et al. examined 3-chloroisobutyranilide and 3-chloroacetanilide, and reported but slight herbicidal activity for this type of compound. Our studies have confirmed these findings.

We have also studied the action of 2,4-dichloroanilides and have found that, although the 2,4-dichlorophenyl group may be potent in certain kinds of molecular structures, it is markedly less active and desirable than our Novel N-3,4-dichlorophenyl carboxylic amides. Furthermore, we have found that the carboxylic amide groups which provide herbicidal activity are highly selective and specific.

It is clear, therefore, that herbicidally active agents in this field of chemistry cannot be predicted from the prior knowledge of compounds which have been demonstrated to exhibit herbicidal activities.

Objects of this invention include providing herbicidal agents which are active against a wide variety of plants, which are thus active at low concentrations and rates of application, and at concentrations and rates which provide differential and controllable effects, as through rate of application, time of application, or method of application. It is also an object to provide chemical substance which may be used to control weeds among established crops.

We have discovered specific compounds which meet the above objects and needs more nearly than previously known compounds. These are 3,4-dichloro-α-methylvaleranilide, 3,4-dichloroisobutyranilide, and 3,4-dichloropropionanilide, which anilides are active against a wide spectrum of plants and yet capable of differential applications.

A good process for preparing these compounds comprises taking up 3,4-dichloroaniline in a volatile, inert, organic solvent and reacting it with the appropriate carboxylic acid or its acid anhydride or its acid halide. In the last case, an alkaline reagent is supplied to take up the hydrogen halide split out. If the carboxylic acid is reacted, the mixture is heated under reflux with removal of water carried over by the azeotroping liquid.

The solvent is desirably a volatile naphtha, benzene, toluene, xylene, dichloroethane, dichloropropane, trichloroethane, or other volatile, inert hydrocarbon or chlorinated hydrocarbon.

With an acyl halide or anhydride, temperature of reaction may be from about 10° to 50° C. When carboxylic acid is used, reaction temperatures may vary from 50° to 150° C. and are conveniently controlled by heating the reaction mixture at reflux temperature.

Typical preparative procedures are shown in the following example, which is presented for purposes of illustration and not by way of limitation. Parts given are by weight unless otherwise designated.

PREPARATION 1

There are mixed 18 parts of 3,4-dichloroaniline and 130 parts of benzene. This mixture is stirred with 91 parts of an aqueous 22.5 percent sodium hydroxide solution and thereto is slowly added at about 25° to 30° C. 46.2 parts of propionyl chloride. External cooling is applied to control the temperature. The reaction mixture is stirred for an additional two hours and left standing to form layers. The organic layer is taken and diluted with about 250 parts by volume of octane. The product precipitates as a white solid. It is filtered off and dried to give 96 parts of 3,4-dichloropropionanilide melting at 91° C. It is recrystallized from aqueous alcohol and then melts at 92° to 93° C. By analysis the product contains 32.2 percent of chlorine (theory 32.4 percent).

The compounds of this invention may be applied to the plants to be treated from aqueous sprays or from dusts. Usually the rates of application are from about 0.5 lb. per acre to 20 lbs. per acre, depending in part upon such facts as formulation used, the type of application, the stage of growth, and the end result desired.

Aqueous sprays may be based on an emulsifiable concentrate or upon a wettable powder. A useful type of emulsifiable concentrate may be prepared from 25 parts of one or more of the 3,4-dichloroanilides of this invention, 40 to 50 parts of isophorone, 20 to 30 parts of an aromatic naphtha or xylene or toluene or mixtures of such solvents, and 2 to 10 parts of one or more solvent-soluble emulsifying agents. Small amounts of blending or coupling agents may be used to assist in forming a homogeneous solution, such as methanol, methoxyethanol, or butoxyethoxyethanol.

A typical useful emulsifier is prepared from 1 to 1.5 parts of calcium dodecylbenzene sulfonate or sodium dioctylsulfosuccinate, 2.5 to 4 parts of an octyl- or nonyl-phenoxypolyethoxy-ethanol together with about 0.5 to 1 parts of methanol and 0 to 0.5 part of xylene. The resulting mixture may be added to the above proportions of solvents and anilide or mixture of anilides. But other surface active agent or agents may be used.

The particular agent used is primarily a matter of choice and convenience. There may be used an anionic, cationic, or non-ionic emulsifying agent which is solvent-soluble. In place of the above-mentioned non-ionic agent derived from an alkylphenol and ethylene oxide, there may, for example, be used ethylene oxide condensates of long-chained alcohols, carboxylic acids, thiols, or amines. Compounds of all these types are

available commercially. Also, non-ionic condensates of polyglycerols and fatty acids, or of polyglycerols, fatty acids, and a resin-forming acid, such as phthalic acid, find use in preparing self-emulsifying compositions. Typical anionic agents are based on alcohol sulfates or sulfonates, or sulfosuccinates. Solvent-soluble cationic surface active agents may be represented by oleylbenzyldimethylammonium chloride or dodecylbenzyltrimethylammonium chloride or bromide. As can be seen, the exact nature of the emulsifier is not critical, provided it is soluble in the solution of 3,4-dichloroanilide in one or more inert organic solvents.

A wettable powder may be prepared by taking up one of the 3,4-dichloroanilides of this invention in a volatile solvent, such as acetone, and applying it to finely divided solid, such as kaolin, pyrophyllite, or diatomaceous earth with evaporation of solvent. The powder is heated with small amounts of one or more wetting and dispersing agents. A typical formula is 20 parts of a 3,4-dichloroanilide of this invention, 77.5 parts of one or more finely divided solids, 0.5 part of a wetting agent such as an octylphenoxypolyethoxyethanol, and 2 parts of the sodium salt of condensed naphthaleneformaldehyde sulfonate.

Dusts containing 5 to 10 percent of active agent may be prepared by diluting such a wettable powder with finely divided solid carrier. If desired, the wetting agent, octylphenoxypolyethoxyethanol, may be omitted and the dispersing agent may be omitted or varied, as desired.

In any of the herbicidal compositions such as described above, there may be used an individual 3,4-dichloroanilide of this invention or a mixture of two or three of these. The compositions will include a carrier and in most cases a surface active agent.

A standard method for comparision of herbicidal agents as used in evaluating the compounds of our invention, related compounds, and other compounds, comprises planting crop and weed seeds in soil in flats, allowing the seed to germinate and the seedlings to develop, and treating the resulting plants with a spray or dust about two weeks after the seeds are planted. About two weeks later, the state of growth and the phytotoxic effects are evaluated. Sprays are applied usually at a standard carrier rate of 50 gallons per acre and the concentration of herbicidal agent varied to supply it at the desired rate; e.g. 1, 2, 3, 5 or 10 pounds per acre. In some tests the carrier rate may be varied, as to 10 or 20 gallons per acre, as would be practiced with highly dispersed sprays under high pressures. Carrier rates may also be increased if desired. The rate of application of agent appears to be the more critical factor, rather than merely the concentration. Comparisions may also be carried out in the field.

Monocotyledonous plants used in the present studies included crabgrass, foxtail, millet, wheat, ryegrass, wild oats, and Johnson grass.

Dicotyledonous plants used included beans, flax, pepper grass, plantain, lamb's quarter, chickweed, curly dock, pigweed, ragweed, scarlet pimpernel, and purslane.

When monocotyledonous plants were treated in the standard flats, kills of 98 and 99 percent respectively were obtained at the rates of 5 to 10 pounds per acre when 3,4-dichloropropionanilide was used as the agent and applied from liquid sprays. In comparison tests performed at the same time and under the same conditions, 2,5-dichloropropionanilide gave kills of 0 and 10 percent respectively at rates of 5 and 10 pounds per acre, while 2,4-dichloropropionanilide gave kills of 3 and 12 percent respectively at these rates. These data bring out the very unusual capacity of the 3,4-dichloroanilides of this invention to control monocotyledonous plants.

As might be expected, dicotyledonous plants are somewhat more sensitive to herbicidal agents in general. Thus, 2,5-dichloropropionanilide gave kills of 10 and 23 percent respectively at these same rates, while the 2,4-dichloropropionanilide gave kills of 15 and 20 percent respectively. In contrast, 3,4-dichloropropionanilide gave controls of 98 and 99 percent respectively at these same rates. Even against the more susceptible type of plants, it is clear that the 3,4-dichloropropionanilide is greatly more effective than the comparable 2,4-dichloroanilide and 2,5-dichloroanilide.

Comparisons were made for a series of 3,4-dichloroanilides of various monocarboxylic acids. The data summarizing results are presented in Table I.

They demonstrate the remarkable herbicidal action of the compounds of this invention and the highly selective action of these particular dichloro compounds.

TABLE I

Compound	POST-EMERGENCE PHYTOTOXICITY AT RATE OF 1 LB/ACRE				
	Crabgrass	Foxtail	Wild Oats	Millet	Mallow
$CH_3CONHC_6H_2Cl_2$-3,4	30	13	13	27	57
$C_2H_5CONHC_6H_2Cl_2$-3,4	100	90	83	100	100
$i\text{-}C_3H_7CONHC_6H_2Cl_2$-3,4	90	75	88	100	93
$n\text{-}C_3H_7CONHC_6H_2Cl_2$-3,4	43	13	10	52	95
$C_2H_5CH(CH_3)CONHC_6H_2Cl_2$-3,4	100	93	100	95	
90					

Comparisons were also made of the activities of the 3,4-dichloroanilides of this invention against activities of 3-chloropropionanilide, 4-chloropropionanilide, 3-chloroisobutyranilide, and 4-chloroisobutyranilide. Test data are summarized in Table II. They show the remarkable effectiveness of the dichloroanilides of this invention against a variety of typical plants. They also show that monochloro analogues are much less effective. It might be connected that the 3- or 4-chloro-α-methylvaleranilides are much less active than the other monochloroanilides, data for which are given in Table II, and their activities are too low to be of any significance.

TABLE II

POST-EMERGENCE PHYTOTOXICITY AT RATE OF 1 LB./ACRE						
Compound	Sorghum	Crabgrass	Foxtail	Wild Oats	Millet	Mallow
$C_6H_5CONHC_6H_4Cl$-3	10	3	3	7	7	22
$C_6H_5CONHC_6H_4Cl$-4	20	43	17	17	36	50
$C_6H_5CONHC_6H_3Cl_2$-3,4	92	100	90	83	100	100
i-$C_3H_7CONHC_6H_4Cl$-3	30	27	13	17	25	40
i-$C_3H_7CONHC_6H_4Cl$-4	27	40	13	17	33	57
i-$C_3H_7CONHC_6H_3Cl_2$-3,4	88	90	75	88	100	93
$C_6H_5CH(CH_3)CONHC_6H_3Cl_2$-3,4	90	100	93	100	95	

The effective weedicidal action of 3,4-dichloropropionanilide, 3,4-dichloroisobutyranilide, and 3,4-dichloro-α-methylvaleranilide is also established by data obtained in the field. When these compounds are applied from aqueous sprays to weeds which have supported from 1 to 3 weeks prior to treatment, excellent control is obtained at rates of 1 to 6 pounds per acre for both monocotyledonous and dicotyledonous plants.

Another study under field conditions has been concerned with control of annual grasses and weeds growing among perennial grasses using 3,4-dichloropropionanilide. At suitable rates, such as one to two pounds per acre, it was observed that the annual grasses and weeds can be controlled without injury to the perennial grasses. This makes it possible to control crabgrass, foxtail, chickweed, and the like in established lawns.

these weights of compounds being used in 50 gallons of water. Excellent control of weeds was provided without any damage to the established potato plants. Harvested potato tubers were of excellent yield and quality.

Sprays at 2, 4 and 6 pounds per acre were similarly applied to established tomato plants about the middle of July. The tomato plants continued to grow and mature without weeds being present, even up to the middle of September. At rates of 2 to 4 pounds per acre, there was no more than slight injury to the tomato plants. At 6 pounds per acre, there may be some slight injury shortly after the plots were sprayed, but this is not permanent.

Typical test data relating to the control of weeds in field-grown tomatoes are presented in Table III. Plots were sprayed on July 12 at the indicated rates. Counts of weeds were made on September 13 and compared with weeds on unsprayed control plots.

TABLE III

WEED CONTROL IN TOMATO PLOTS					
Compound	Percent Control				
	Appln. Rate	Crabgrass	Foxtail	Barnyard Grass	Pigweed
$C_6H_5CONHC_6H_3Cl_2$-3,4	2 lb./A	100	90	90	97
$C_6H_5CONHC_6H_3Cl_2$-3,4	4 lb./A	100	100	100	100

Compound	Percent Control				
	Appln. Rate	Lamb's Quarter	Ragweed	Smartweed	Purslane
$C_6H_5CONHC_6H_3Cl_2$-3,4	2 lb./A	95	93	100	95
$C_6H_5CONHC_6H_3Cl_2$-3,4	4 lb./A	100	100	100	100

In field tests, it was also demonstrated that weeds can be controlled in perennial legumes. Sprays applied to dormant alfalfas and clovers in fall, winter, and early spring effectively destroy undesired grasses and weeds without any permanent harm to the desired plants, rates of one to six pounds per acre in 50 gallons of spray being used.

In an orchard in which clover was used as a ground cover there was applied a spray of 3,4-dichloropropionanilide at the rate of two pounds per acre. Weeds of many types, including particularly chickweed and also foxtail, were controlled. There was some defoliation of the clover, but this was only temporary, new leaves soon appearing.

A strawberry bed was sprayed after the close of the picking season, the compound of this invention being used at one and two pounds per acre. Weeds were controlled without evidence of injury to the established strawberry plants. Weeds controlled included crabgrass, foxtail, pigweed, lamb's quarter, smart weed, and ragweed.

A potato patch was sprayed two weeks after the final cultivation with aqueous sprays of the compound of this invention at rates of 2, 4 and 6 pounds per acre.

The 3,4-dichloroanilide of this invention can be effectively used for control of annual weeds in such crops as corn, potatoes, tomatoes, sugar cane, and pineapples.

The 3,4-dichloroanilides of this invention can be used to eliminate growing plants generally by applying 3,4-dichloroanilide at 10 to 50 pounds per acre. Such treatments are useful in preparing areas for capping with asphalt mixes, for example. On the other hand, these compounds can be used for selective control of undesirable plants. If the undesirable plants are in a tender or succulent state, they can be eliminated without destroying established plants in the same area. If directed sprays are used between established plants, weeds can be controlled over a wide range of rates of application, as from 1 to 10 pounds per acre. On the other hand, general applications can also be made, and at safe rates; such as 0.5 to 6 pounds per acre, with selective action.

Of the three compounds set forth in this application, 3,4-dichloropropionanilide, 3,4-dichloroisobutyranilide, and 3,4-dichloro-α-methylvaleranilide, only 3,4-dichloropropionanilide has proven to be uniquely selective insofar as its effect

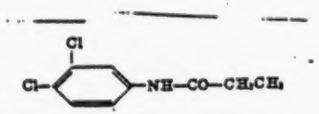
on rice is concerned. Greenhouse tests on rice and the monocots and dicots set forth hereinafter have provided the data set forth in Table IV.

In the table, the rice injury rating is based on a 0 to 10 scale with 10 equal to complete kill. Each anilide was applied to a group of six monocot species (sudan, millet, barnyard grass, crabgrass, orchard grass and foxtail) and seven dicot species (pigweed, curly dock, Indian mallow, mustard, chickweed, sorrel, and lamb's quarter) at application rates of ½, 1, 2 and 4 lb./A (pounds per acre). The percent phytotoxicity values given in the table were obtained by averaging the herbicidal activity on all species (monocot and dicots separately) at the four application rates. Consequently, a considerable amount of data is summarized in the values and, therefore they can be considered as highly reliable measures of the hermicidal activity of the compounds. These data show the remarkable and completely unexpected specificity of 3,4-dichloropropionanilide insofar as non-phytotoxicity to the rice and high phytotoxicity to the undesired weeds and grasses are concerned. It should be noted that even at applications far in excess of those necessary to effect very efficient control of the undesired weeds and grasses, there is only negligible injury to the rice. Thus, at 8 pounds per acre, at least twice the application rate necessary for weed and grass control, there is only 10 percent rice injury. Whereas 3,4-dichloroisobutyranilide and 3,4-dichloro-α-methylvaleranilide effect efficient control of the undesired weeds and grasses, they cause much too high rice injury and could not be used to control undesired plant growth in rice.

TABLE IV

	RICE INJURY RATING APPLICATION RATE-LB/A					% PHYTOTOXICITY MONOCOTS	% PHYTOTOXICITY DICOTS
COMPOUND	1	2	4	6	8		
3,4-dichloropropionanilide	0	0	0	0.5	1.0	77	96
3,4-dichloroisobutyranilide	2	3	6	7	9	70	92
3,4-dichloro-α-methylvaleranilide	6	7	10	10	10	83	100

The structural formula of 3,4-dichloropropionanilide is



The compound can also be named N(3,4-dichlorophenyl)propanamide, N(3,4-dichlorophenyl)-propionamide or 3', 4'-dichloropropionanilide.

We claim:

1. A method for selectively inhibiting growth of undesirable plants in an area containing growing undesirable plants in an established crop, which comprises applying to said area 3,4-dichloropropionanilide at a rate of application which inhibits growth of said undesirable plants and which does not adversely affect the growth of said established crop.

2. The method according to claim 1 wherein the 3,4-dichloropropionanilide is applied in a composition comprising 3,4-dichloropropionanilide and an inert diluent therefor at a rate of between 0.5 and 6 pounds of 3,4-dichloropropionanilide per acre.

3. The method according to claim 1 wherein most of the undesirable plants are destroyed by the 3,4-dichloro-propionanilide applied thereto without substantial adverse effect on the crop growing therewith.

4. The method according to claim 1 wherein the established crop is tomatoes.

5. The method according to claim 1 wherein the established crop is potatoes.

6. The method according to claim 2 wherein the established crop is monocotyledonous.

7. The method according to claim 2 wherein the established crop is dicotyledonous.

8. The method according to claim 2 wherein the undesirable plants include monocotyledonous plants.

9. The method according to claim 2 wherein the undesirable plants include dicotyledonous plants.

10. The method according to claim 2 wherein the established crop is a grain crop.

11. The method according to claim 2 wherein the undesirable plants include barnyardgrass.

12. A method for selectively inhibiting the growth of growing, tender, undesirable, annual plants which are susceptible to 3,4-dichloropropionanilide, said undesirable plants growing in an area containing an established monoctoyledonous crop which is resistant to 3,4-dichloropropionanilide, which comprises applying to said undesirable plants a composition comprising 3,4-dichloropropionanilide and an inert carrier therefor at a rate of application which inhibits growth of said undesirable plants and which does not substantially affect the growth of said established monocotyledonous crop.

* * * * *

CRYSTAL PROPANIL

POST EMERGENCE GRASS AND WEED KILLER

ACTIVE INGREDIENT 3', 4'-dichloropropionanilide*	33%
INERT INGREDIENT	67%
*Equal to 3 lbs. of the active ingredient per gallon.	100%

WARNING: KEEP OUT OF REACH OF CHILDREN.

Avoid breathing spray mist. Harmful if swallowed, absorbed through the skin. Do not get in eyes or on skin or in clothing. In case of contact, flush skin and eyes with plenty of water; for eyes — get medical attention. Do not take internally. May cause skin irritation. Do not store near food or feed. Do not contaminate streams, lakes, or ponds with this material. Do not store at temperatures below 15° F.

CONSULT STATE AGRICULTURAL EXPERIMENTAL STATION OR EXTENSION SERVICE WEED SPECIALISTS FOR FURTHER RECOMMENDATIONS ON DOSAGE, TIMING, WATER MANAGEMENT, AND CULTURAL PRACTICES TO MEET LOCAL CONDITIONS.

DIRECTIONS FOR USE: CRYSTAL PROPANIL is a selective post-emergence herbicide for control of barnyard grass and certain other weeds in rice. CRYSTAL PROPANIL contains 3 lbs. active ingredient per gallon and is mixed with water for spraying. To avoid injury to rice do not mix with insecticides or liquid fertilizer or apply them separately either before or after CRYSTAL PROPANIL treatment, unless such treatments are recommended by State Agricultural Experiment Station or Extension Service Weed Specialists following thorough testing.

TIMING AND DOSAGE: Use CRYSTAL PROPANIL at 1 to 2 gallons (3 to 6 lbs. active) per acre according to the stage and condition of growth of grass. Grasses and weeds should be succulent and growing actively when treated. Optimum temperatures are from 65° to 90° F. Do not use when daytime temperatures below 50° or above 100° F. are expected. The higher dosage is required for stunted, deep rooted grasses growing in very dry surface soil, and for large-tillering grass. Usually one application is sufficient. If retreatment is necessary apply as soon as need is evident.
Use 1 gallon CRYSTAL PROPANIL (3 lbs. active) per acre for actively growing grass in 1 to early 4-leaf stage with shallow roots.
Use 1½ to 1½ gallons CRYSTAL PROPANIL (4 to 4½ lbs. active) per acre for actively growing grass in 4 to 5 leaf and early tillering stage, or for stunted 1 to 4 leaf grass with deeper roots growing in dry soil. Use 1½ to 2 gallons CRYSTAL PROPANIL (5 to 6 lbs. active) per acre for tillering grass, 8 to 12 inches tall, only in emergency conditions. Only partial control may be expected.

TO AVOID RESIDUES AT HARVEST, DO NOT APPLY AFTER FULL TILLERING OF RICE OR WITHIN 56 DAYS BEFORE HARVEST. DO NOT EXCEED A TOTAL OF 8 LBS. ACTIVE PER ACRE PER SEASON.

METHOD OF SEEDING: CRYSTAL PROPANIL may be used on dry planted (drilled or broadcast) or on muddy or clear water planted rice. For best results, field should be uniformly level and have well prepared seedbeds free of large clods to encourage uniform and rapid emergence of rice, grass and weeds. Adequate inlets, drains and cross-levees should be provided to permit quick draining, flushing or flooding before and after treatment to meet the optimum water requirements for the rice crop and for optimum use of CRYSTAL PROPANIL in grass control.

WATER MANAGEMENT BEFORE TREATMENT:

Dry Planting: Plant in a moist seedbed, or flush to germinate the rice.
Muddy Water Planting: The planting flood is usually drained 1 to 3 days after seeding.
Clear Water Planting: Planting flood may be deep or shallow but is lowered as soon as the rice is "pegged". Maintain a shallow flood or intermittent flushing until the rice is well rooted. Avoid deep flooding from time of pegging until treatment; this encourages tall, spindly rice which may lodge in the mud after draining.

IN ALL METHODS OF PLANTING, FLUSH THE FIELDS AS OFTEN AS NEEDED TO PREVENT DRYING AND SOIL CRUSTING AND TO AID THE EMERGENCE OF RICE AND GRASS. DURING PERIODS OF HIGH TEMPERATURE, DRYING WINDS AND LOW RAINFALL, IT IS ESPECIALLY IMPORTANT TO FLUSH OFTEN ENOUGH TO KEEP THE GRASS GROWING ACTIVELY AND THUS MORE SUSCEPTIBLE TO THE OPTIMUM DOSAGE OF CRYSTAL PROPANIL. ALL OR MOST OF THE WATER SHOULD BE OFF THE FIELD AT THE TIME OF SPRAYING TO ALLOW FULL COVERAGE OF THE GRASSES AND WEEDS.
Treat grassy and weedy fields with CRYSTAL PROPANIL when a satisfactory stand of rice that tolerates flooding is established. Follow the recommendations according to the stage and condition of the growth of the grass as shown above under Timing and Dosage.

WATER MANAGEMENT AFTER TREATMENT: TREATED FIELDS SHOULD ALWAYS BE FLOODED BEFORE A SECOND INFESTATION OF GRASS HAS A CHANCE TO DEVELOP BEYOND THE ONE-LEAF STAGE. Start flooding in 12 to 24 hours in warm, sunny weather if treatment has been made on actively growing grass in moist soil. During cool, cloudy weather or if treatment is made on slow growing grass in dry soil, delay flooding until 2 to 5 days afterwards to allow maximum time for kill. Cover the grass completely and maintain the flood at least 2 inches deep on the highest parts of the field even though the rice is submerged temporarily. As the rice grows above the water, deepen the flood accordingly. In general, rice can be grown with shallower flooding after CRYSTAL PROPANIL treatment than when water flooding after is used for grass control.

FERTILIZER: Fields to be treated with CRYSTAL PROPANIL may be fertilized before or at planting time. Place nitrogenous fertilizer 2 to 4 inches deep to minimize loss during periods when the fields are drained. Fertilizer may also be applied just before flooding. Apply nitrogen at any appropriate time. Do not use CRYSTAL PROPANIL fertilizer in combination application.

APPLICATION EQUIPMENT: Apply CRYSTAL PROPANIL with aircraft or ground sprayers. Carefully calibrate and adjust equipment to give medium-fine droplets in a uniform pattern that provides complete coverage. Flush sprayers with clear water after each day's use. Clean all equipment used for CRYSTAL PROPANIL with a detergent rinse, followed by a clear water rinse, before and after spraying other materials or other crops such as cotton, soybeans, vegetables, fruits, etc. Applicators and flagmen should avoid contact with spray mist from CRYSTAL PROPANIL or any pesticides and should wear protective clothing and goggles. Wash thoroughly after exposure.

AIRCRAFT: Fixed wing or helicopter agricultural aircraft equipped with well designed spray distribution systems that produce a uniform medium-fine droplet spray may be used for CRYSTAL PROPANIL. Gravity flow fertilizer sprayers or venturi-type spreader-seeders should not be used. Apply CRYSTAL PROPANIL in no less than 10 gallons total spray per acre with standard boom-nozzle or with "Swathmaster" sprayers. Somewhat higher gallonages are suggested for extra thick or tall grass. Five gallons per acre appear satisfactory with "Micronair Rotary Atomiser" sprayers. Swath width is governed by the design of the aircraft, its spray distribution system and its operation, and should be pre-determined for each unit. Generally, the optimum swath width should not exceed the wing span of the aircraft, and is frequently less. Swaths must be measured accurately for flagging. Excessively wide or narrow swaths result in streaking and uneven distribution.

GROUND SPRAYERS: Standard low pressure herbicide sprayers equipped with flat fan or boom-jet nozzles are satisfactory. Use nozzles which deliver a medium-fine droplet in 15 to 40 gallons total spray per acre at 40 to 50 psi and at ground speeds not in excess of 3 to 4 m.p.h. Because of the contour levees in most rice fields, special care is needed to avoid skips and double spraying, and to avoid raising the boom too high so the spray fails to reach the weeds uniformly.

OPERATION CONDITIONS: Do not apply with aircraft when winds exceed 4 to 5 m.p.h. or with ground equipment with winds over 6 to 8 m.p.h. A cross-wind during spraying is desirable to equalize distribution. Fields may be treated when grass is either dry or wet with dew. Do not spray if rain threatens in 6 hours.

DRIFT HAZARD TO OTHER CROPS: CRYSTAL PROPANIL injures most crops except cereal grains and perennial grasses. Avoid drift or accidental application from turning aircraft on cotton, soybeans, corn, safflower, seedling legumes, vegetables, orchards, vineyards, gardens, shrubs, and ornamentals. Do not spray within ½ mile of sensitive crops downwind with either air or ground equipment when winds reach maximum recommended velocity for application. Do not spray within 50 feet with aircraft, or within 10 feet with ground equipment of sensitive crops on the upwind side. Once CRYSTAL PROPANIL is applied, it will not release fumes hazardous to nearby crops.

RICE INJURY: All leading commercial varieties of rice are exceptionally tolerant of CRYSTAL PROPANIL. A yellowing or leaf burn of rice may be noted after treatment, but new growth is normal. Under some conditions, severe leaf burn and partial killing of rice may occur. Growers are warned to use caution when applying CRYSTAL PROPANIL during extremely hot weather or to rice that may be in a weakened or sensitive condition from over-watering, soil salts, or other causes.

EFFECT ON OTHER SPECIES: Perennial species such as cattail Typha latifolia; bulrush Scirpus spp; nutgrass Cperus spp. (nut type); Johnsongrass Sorghum halepense; knotgrass Paspalum distichum (water bermuda grass); longtom Paspalum lividum which develop from well established roots, rhizomes, corms or nuts may be temporarily injured by CRYSTAL PROPANIL but usually recover. Several aquatic species may be injured by CRYSTAL PROPANIL but usually develop in rice fields after the normal time of treatment for barnyardgrass. These include: duck salad Heteranthera spp; Arrowhead (lilies) Sagittaria spp; redstem Ammannia coccinea; Sprangletop Leptochloa spp., and red rice. Oryza Sativa are not controlled with CRYSTAL PROPANIL.

LIMITATIONS AND TOLERANCES FOR: Crop—Rice Limitations—56 days or before tillering Tolerance—None *
*Recommended use does not result in residues at harvest. DO NOT RE-USE CONTAINER. DESTROY WHEN EMPTY EPA Reg. No. 6874-10

Manufactured for

CRYSTAL CHEMICAL COMPANY

1525 N. POST OAK RD. • HOUSTON, TEXAS 77055

EXHIBIT 1

WEEDS CONTROLLED

Barnyardgrass (Watergrass)
Echinochloa crusgalli* or *Echinochloa colonum

Alligator Weed
Alternanthera philoxeroides
Brachiaria
Brachiaria spp.
Crabgrass
Digitaria sanguinalis
Croton
Croton capitatus
Curly Indigo
Aeschynomene virginica
Foxtail
Setaria spp.
Goosegrass
Eleusine indica
Gulf Cockspur
Echinochloa crus-pavonis
Hoarahgrass
Fimbristylis miliacea
Mexican Weed
Caperonia palustris
Paragrass
Panicum purpurascens
Pigweed
Amaranthus retroflexus
Redweed (Teaweed)
Melochia corchorifolia
Sour Dock
Rumex crispus
Spurhead
Rhynchospora corniculata
Tall Indigo or Coffee Bean
Sesbania exaltata
Texas Millet
Panicum texanum
Wiregrass
Eleocharis spp.

WEEDS NOT CONTROLLED

Arrowhead
Sagittaria spp.
Bermudagrass
Cynodon dactylon
Cattail
Typha latifolia
Duckweed
Heteranthera spp.
Johnsongrass
Sorghum halepense
Nutgrass
Cyperus spp.
Red Rice
Oryza sativa
Sprangletop
Leptochloa spp.

GENERAL INFORMATION

CRYSTAL PROPANIL 4E is a post-emergence herbicide for the control of many grasses and broadleaf weeds in rice fields only. It may be applied by either ground or aerial spray equipment, after dilution and thorough agitation with water. CRYSTAL PROPANIL 4E is not a hormone-type herbicide, but kills susceptible plants by direct contact action. For this reason, thorough spray coverage of weeds to be killed is necessary for best results.

CRYSTAL PROPANIL 4E should be applied when weeds and grasses are small, (See Directions for Use). Use only on fields which have been drained of flood water.

Rice fields to be treated should be inspected frequently before the application of CRYSTAL PROPANIL 4E to insure that barnyard or watergrass is at the proper stage of growth (1 to 3 leaf stage with an occasional 4 leaf plant).

ATTENTION: Never apply CRYSTAL PROPANIL 4E except as recommended on this label because use in any other way may result in damage or injury to persons, animals, or crops, or other unintended consequences.

DO NOT APPLY CRYSTAL PROPANIL 4E WITHIN FOURTEEN DAYS before or after insecticide applications because serious damage to rice may occur.

Do not apply to any crops other than rice.

Before applying CRYSTAL PROPANIL 4E, make sure the spray equipment is properly calibrated to avoid over- or under-treatment.

Do not apply CRYSTAL PROPANIL 4E under wind conditions which will allow drift to adjacent susceptible crops such as beans, soybeans, cotton, safflower, cucurbits, vegetables, orchards and other sensitive crops. Wind velocity greater than 5 miles per hour will often cause applications to be streaked and give less than maximum herbicidal control.

Keep this container closed when not in use. Do not reuse for other purposes as its toxic contents cannot be entirely removed.

Do not reuse empty container. Destroy it by perforating or crushing. Bury or discard in a safe place.

This product is toxic to fish. Keep out of lakes, streams and ponds. Do not contaminate water by cleaning of equipment, or disposal of wastes.

DIRECTIONS FOR USE—RICE ONLY

Do not use until you have also read the entire label.

Rice fields should be well prepared and free of large clods to obtain uniform germination of grasses and weeds, and to insure uniform flood levels. If necessary, fields may be flushed prior to treatment to produce uniform grass germination. If fields are flushed prior to treatment, flush in sufficient time so that grass and rice are growing vigorously at time of treatment. Water should be drained from fields before spraying so that grasses and weeds are fully exposed to the spray.

CRYSTAL PROPANIL 4E acts only on grasses and weeds which have already germinated. Maximum action usually is not apparent until 3 to 5 days after application). To prevent more weeds from germinating after treatment, fields should be flooded within 24 hours after spraying, or as soon as possible after 24 hours. Flooding after spraying will improve the grass control after CRYSTAL PROPANIL 4E treatment. In cases where flooding of the field would not be complete within seven days or less after application of CRYSTAL PROPANIL 4E, it is best to treat a portion of the field, flood that treated portion, and then treat the remainder. This will help prevent reinfestation of weeds and grasses. Higher rates (4-6 quarts) may be necessary on the remainder since the grass will be more mature.

If the rice is too small to maintain a flood on the field, treatment should be delayed until the rice is large enough. The grass may then be large enough to require 4-6 quarts of CRYSTAL PROPANIL 4E.

Avoid treatment if rain threatens within 6-8 hours or if high winds may cause uneven application or drift.

In case of unseasonably cool weather, higher rates (4-6 quarts acre) of CRYSTAL PROPANIL 4E may be necessary. The number of leaves of barnyard or watergrass determines the time and amount of CRYSTAL PROPANIL 4E to spray, regardless of the size of the rice. THE GROWER SHOULD INSPECT FIELDS FREQUENTLY TO DETERMINE PROPER TIME OF APPLICATION. The ideal application time is when most barnyardgrass has one to three leaves, with only an occasional plant having four leaves. During drought conditions grasses may reach the three leaf stage while still quite short or stunted, so special attention to stage of growth is necessary in these situations to avoid grasses becoming too mature for best results.

Apply 3 quarts of CRYSTAL PROPANIL 4E per acre when most grass has reached the one to three leaf stage. Use 4 to 6 quarts of CRYSTAL PROPANIL 4E per acre if grasses are larger, with most in the four to six leaf stage. Mix CRYSTAL PROPANIL 4E thoroughly with water for spraying, using vigorous mechanical agitation. For AERIAL APPLICATION dilute the proper amount of CRYSTAL PROPANIL 4E with 10 to 12 gallons of water per acre. For GROUND EQUIPMENT dilute the proper amount of CRYSTAL PROPANIL 4E with 15 to 25 gallons of water per acre. Lesser amounts of water often give inadequate coverage and may cause poor results.

If fields cannot be completely drained so that all of the grass is exposed, a higher dosage of CRYSTAL PROPANIL 4E (4-6 quarts acre) must be used.

NOTICE—When CRYSTAL PROPANIL 4E is applied, especially after the fourth leaf stage of growth of the rice, under some conditions, visible leaf injury on rice may result. However, the rice plants quickly outgrow such injury when caused by the later applications.

USE IN CALIFORNIA ONLY—Where rice fields are not completely drained.

NOTE: Before using, read entire label.

To control watergrass, apply CRYSTAL PROPANIL 4E 30 to 45 days after planting, before rice is fully tillered, when watergrass extends 6 to 8 inches above water surface. If rice has a deep flood, water level may be lowered to 3-4 inches over highest part of field to expose 6-8 inches of watergrass. (When lowering water level, do so slowly to avoid pulling down rice plants). Use 4 quarts per acre if most grass has developed 3-5 leaves, use 6 quarts if most grass has 5-6 leaves, and use 6 quarts per acre if most grass has 7 or more leaves. Apply in no less than 10-12 gallons of water, using a medium-fine spray.

If higher water level is desired after treating, reflooding may be started 12 hours after treatment.

NOTICE

Use of this material other than in accordance with directions on this label may produce plant injury, excessive residues, or other undesirable results. Crystal Chemical Company makes no express or implied warranties other than specified on this label.

CRYSTAL PROPANIL 4E

For post-emergence control of Barnyardgrass and other weeds in Rice

ACTIVE INGREDIENT:	
3', 4'-Dichloropropionanilide	45.0%
INERT INGREDIENTS:	55.0%

*Contains 4 pounds of 3', 4'-dichloropropionanilide per gallon.

Use only according to these label instructions.

CAUTION: *KEEP OUT OF REACH OF CHILDREN.*

Harmful if swallowed or absorbed through skin. Causes severe eye irritation. May cause skin irritation. Avoid contact with eyes, skin or clothing. Avoid prolonged breathing of vapor or mist. Keep away from heat, sparks and open flame. In case of contact, flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention. Do not store near food, fertilizer, seeds, insecticides or fungicides.

CRYSTAL CHEMICAL COMPANY
1525 N. Post Oak Road
Houston, Texas 77055

30 NET U.S. GALLONS

7 [198]

EXHIBIT 2

NET CONTENTS: GALLONS

EPA Reg. No. 6874-10

CONTROL NO. _____

PROPANEX

POST EMERGENCE GRASS AND WEED KILLER

Active Ingredient	
3', 4'-dichloropropionanilide*	35%
Inert Ingredient	65%
	100%

*Equal to 3 lbs. of the active ingredient per gallon.

WARNING: *KEEP OUT OF REACH OF CHILDREN.*

Avoid breathing spray mist. Harmful if swallowed, absorbed through the skin. Do not get in eyes or on skin or in clothing. In case of contact, flush skin and eyes with plenty of water; for eyes—get medical attention. Do not take internally. May cause skin irritation. Do not store near food or feed. Do not contaminate streams, lakes, or ponds with this material. Do not store at temperatures below 15° F.

Consult state agricultural experimental station or extension service weed specialists for further recommendations on dosage, timing, water management, and cultural practices to meet local conditions.

CRYSTAL CHEMICAL COMPANY
1525 N. Post Oak Road
Houston, Texas 77055

DO NOT REUSE CONTAINER. DESTROY WHEN EMPTY.

DIRECTIONS FOR USE: PROPANEX is a selective post-emergence herbicide for control of barnyard grass and certain other weeds in rice. PROPANEX contains 3 lbs. active ingredient per gallon and is mixed with water for spraying. To avoid injury to rice do not mix with insecticides or liquid fertilizer or apply them separately either before or after PROPANEX treatment, unless such treatments are recommended by State Agricultural Experiment Station or Extension Service Weed Specialist following thorough testing.

TIMING AND DOSAGE: Use PROPANEX at 1 to 2 gallons (3 to 6 lbs. active) per acre according to the stage and condition of growth of grass. Grasses and weeds should be succulent and growing actively when treated. Optimum temperatures are from 65° to 90° F. Do not use when daytime temperatures below 50° or above 100° F. are expected. The higher dosage is required for stunted, deep rooted grasses growing in very dry surface soil, and for large-tillering grass. Usually one application is sufficient. If retreatment is necessary apply as soon as need is evident. Use 1 gallon PROPANEX (3 lbs. active) per acre for actively growing grass in 1 to early 4-leaf stage with shallow roots.

Use 1½ to 1⅔ gallons PROPANEX (4 to 4½ lbs. active) per acre for actively growing grass in 4 to 6 leaf and early tillering stage, or for stunted 1 to 4 leaf grass with deeper roots growing in dry soil. Use 1½ to 2 gallons PROPANEX (4½ to 6 lbs. active) per acre for tillering grass, 6 to 12 inches tall, only in emergency conditions. Only partial control may be expected.

To avoid residues at harvest, do not apply after full tillering of rice or within 56 days before harvest. Do not exceed a total of 8 lbs. active per acre per season.

METHOD OF SEEDING: PROPANEX may be used on dry planted (drilled or broadcast) or on muddy or clear water planted rice. For best results, field should be uniformly level and have well prepared seedbeds free of large clods to encourage uniform and rapid emergence of rice, grass and weeds. Adequate inlets, drains and cross-levees should be provided to permit quick draining, flushing or flooding before and after treatment to meet the optimum water requirements for the rice crop and for optimum use of PROPANEX in grass control.

WATER MANAGEMENT BEFORE TREATMENT:

Dry Planting: Plant in a moist seedbed, or flush to germinate the rice.

Muddy Water Planting: The planting flood is usually drained 1 to 3 days after seeding.

Clear Water Planting: Planting flood may be deep or shallow but is lowered as soon as the rice is "pegged". Maintain a shallow flood or intermittent flushing until the rice is well rooted. Avoid deep flooding from time of pegging until treatment; this encourages tall, spindly rice which may lodge in the mud after draining.

In all methods of planting, flush the fields as often as needed to prevent drying and soil crusting and to aid the emergence of rice and grass. During periods of high temperature, drying winds and low rainfall, it is especially important to flush often enough to keep the grass growing actively and thus more susceptible to the optimum dosage of PROPANEX. All or most of the water should be off the field at the time of spraying to allow full coverage of the grasses and weeds.

Treat grassy and weedy fields with PROPANEX when a satisfactory stand of rice that tolerates flooding is established. Follow the recommendations according to the stage and condition of the growth of the grass as shown above under Timing and Dosage.

Water management after treatment: Treated fields should always be flooded before a second infestation of grass has a chance to develop beyond the one-leaf stage.

Start flowing in 12 to 24 hours in warm, sunny weather if treatment has been made on actively growing grass in moist soil. During cool, cloudy weather or if treatment is made on slow growing grass in dry soil, delay flooding until 2 to 5 days afterwards to allow maximum time for kill. Cover the grass completely and maintain the flood at least 2 inches deep on the highest parts of the field even though the rice is submerged temporarily. As the rice grows above the water, deepen the flood accordingly. In general, rice can be grown with shallower flooding after PROPANEX treatment than when water flooding after is used for grass control.

FERTILIZER: Fields to be treated with PROPANEX may be fertilized before or at planting time. Place nitrogenous fertilizer 2 to 4 inches deep to minimize loss during periods when the fields are drained. Fertilizer may also be applied just before flooding. Apply nitrogen at any appropriate time. Do not use PROPANEX fertilizer in combination application.

APPLICATION EQUIPMENT: Apply PROPANEX with aircraft or ground sprayers. Carefully calibrate and adjust equipment to give medium fine droplets in a uniform pattern that provides complete coverage. Flush sprayers with clear water after each day's use. Clean all equipment used for PROPANEX with a detergent rinse, followed by a clear water rinse, before and after spraying other materials or other crops such as cotton, soybeans, vegetables, fruits, etc. Applicators and flagmen should avoid contact with spray mist from PROPANEX or any pesticides and should wear protective clothing and goggles. Wash thoroughly after exposure.

AIRCRAFT: Fixed wing or helicopter agricultural aircraft equipped with well designed spray distribution systems that produce a uniform medium-fine droplet spray may be used for PROPANEX. Gravity flow fertilizer sprayers or venturi-type spreader-seeders should not be used. Apply PROPANEX in no less than 10 gallons total spray per acre with standard boom-nozzle or with "Swathmaster" sprayers. Somewhat higher gallonages are suggested for extra thick or tall grass. Five gallons per acre appear satisfactory with "Micronair Rotary Atomizer" sprayers. Swath width is governed by the design of the aircraft, its spray distribution system and its operation, and should be pre-determined for each unit. Generally, the optimum swath width should not exceed the wing span of the aircraft, and is frequently less. Swaths must be measured accurately for flagging. Excessively wide or narrow swaths result in streaking and uneven distribution.

GROUND SPRAYERS: Standard low pressure herbicide sprayers equipped with flat fan or boom-jet nozzles are satisfactory. Use nozzles which deliver a medium-fine droplet in 15 to 40 gallons total spray per acre at 40 to 60 psi and at ground speeds not in excess of 3 to 4 m.p.h. Because of the tractor levees in most rice fields, special care is needed to avoid skips and double spraying, and to avoid raising the boom too high so the spray fails to reach the weeds uniformly.

OPERATION CONDITIONS: Do not apply with aircraft when winds exceed 4 to 5 m.p.h. or with ground equipment with winds over 6 to 8 m.p.h. A cross-wind during spraying is desirable to equalize distribution. Fields may be treated when grass is either dry or wet with dew. Do not spray if rain threatens in 6 hours.

DRIFT HAZARD TO OTHER CROPS: PROPANEX injures most crops except cereal grains and perennial grasses. Avoid drift or accidental application from turning aircraft on cotton, soybeans, corn, safflower, seedling legumes, vegetables, orchards, vineyards, gardens, shrubs, and ornamentals. Do not spray within ½ mile of sensitive crops downwind with either air or ground equipment when winds reach maximum recommended velocity for application. Do not spray within 50 feet with aircraft, or within 10 feet with ground equipment of sensitive crops on the upwind side. Once PROPANEX is applied, it will not release fumes hazardous to nearby crops.

RICE INJURY: All leading commercial varieties of rice are exceptionally tolerant of PROPANEX. A yellowing or leaf burn of rice may be noted after treatment, but new growth is normal. Under some conditions, severe leaf burn and partial killing of rice may occur. Growers are warned to use caution when applying PROPANEX during extremely hot weather or to rice that may be in a weakened or sensitive condition from over-watering, soil salts, or other causes.

EFFECT ON OTHER SPECIES: Perennial species such as cattail Typha latifolia; bulrush Scirpus spp; nutgrass Cyperus spp. (nut type); Johnsongrass Sorghum halepense; knotgrass Paspalum distichum (water bermuda grass); longtom Paspalum lividum which develop from well established roots, rhizomes, corms or nuts may be temporarily injured by PROPANEX but usually recover. Several aquatic species may be injured by PROPANEX but usually develop in rice fields after the normal time of treatment for barnyardgrass. These include: duck salad Heteranthera spp; Arrowhead (lillies) Sagittaria spp; redstem Ammannia coccinea; Sprangletop Leptochloa spp., and red rice. Oryza Sativa are not controlled with PROPANEX.

LIMITATIONS AND TOLERANCES FOR:

Crop	Limitations	Tolerance
Rice	56 days or before tillering	None*

*Recommended use does not result in residues at harvest.

EXHIBIT 3

8 [1991]

SUPERNOX

POST EMERGENCE GRASS AND WEED KILLER

Active Ingredient	
2, 4 - dichlorophenoxyacetic*	25%
Inert Ingredient	75%
	100%

*Equal to 2 lbs. of the active ingredient per gallon.

WARNING: KEEP OUT OF REACH OF CHILDREN.

Avoid breathing spray mist. Wear hat or sunbonnet. Do not get spray on skin or on clothing. In case of contact, flush skin and eyes with plenty of water. See eyes — get medical attention. Do not take internally. May cause skin irritation. Do not place near food or feed. Do not contaminate streams, lakes, or ponds with this material. Do not store at temperatures below 15 F.

CONSULT YOUR AGRICULTURAL EXPERIMENTAL STATION OR EXTENSION SERVICE WITH SPECIFICS FOR PARTICULAR RECOMMENDATIONS TO INCLUDE, TIMING, METHOD AND AMOUNT, AND CULTURAL PRACTICES TO MEET LOCAL CONDITIONS.

NOTICE: Seller warrants that the product conforms to the chemical description and is reasonably fit for the purposes stated on the label when used in accordance with the directions under normal conditions of use, but neither this warranty nor any other warranty of merchantability or fitness for a particular purpose expressed or implied, apply to the use, storage or handling of this product contrary to label instructions, or under abnormal circumstances, or under conditions not reasonably foreseeable to seller, and buyer assumes the risk of any such use. These risks include, but are not limited to damage to plants, crops and animals to which the material is applied, failure to control pests, damage caused by drift to other plants or crops, and personal injury. USDA Reg. No. 6564-11

NET CONTENTS: 30 GALLONS

Dawson Chemical Company
Houston, Texas

EXHIBIT 4

HELENA

BRAND

PROPANIL-3

CAUTION KEEP OUT OF REACH OF CHILDREN.
SEE OTHER CAUTION STATEMENTS ON SIDE PANEL.

ACTIVE INGREDIENTS	
3', 4'-Dichloropropionanilide*	35%
INERT INGREDIENTS	65%
TOTAL	100%

*Equal to 3 lbs. of the active ingredient per gallon.

MANUFACTURED BY
HELENA CHEMICAL COMPANY
WEST HELENA, ARK. — TAMPA, FLA. — LUBBOCK, TEX.

READ ENTIRE LABEL BEFORE USING

CAUTION

Avoid breathing spray mist. Do not get in eyes or on skin. In case of contact, flush skin and eyes with plenty of water; for eyes get medical attention. Harmful if swallowed. Do not store near feed or foodstuffs. To protect fish and wildlife, do not contaminate streams, lakes or ponds with this material. Do not store at temperatures below 15° f.

KEEP OUT OF REACH OF CHILDREN

DIRECTIONS FOR USE

(Southern United States Only)

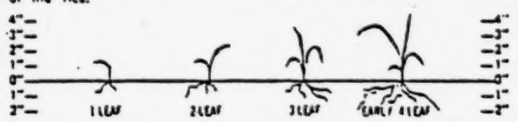
RICE—PROPANIL - 3 is a selective post-emergence herbicide for control barnyardgrass and related grass species and certain other weeds in rice. Mix only with water and apply as a spray. Do not add oils, adjuvants, liquid fertilizer, or certain insecticides (see compatibility below), to do so may cause injury to rice.

PROPANIL - 3, as most any herbicide, is more effective on succulent, actively growing grass and weeds. For best results apply PROPANIL - 3 when all conditions are as near optimum as possible. Read the directions completely and follow carefully.

TIMING AND DOSAGE—Treat grassy and weedy fields when a satisfactory stand of rice that will tolerate flooding is established. Use PROPANIL - 3 at 1 to 1-2/3 gallons (3 to 5 lbs. active) per acre depending on the stage and condition of growth of grass and weeds and according to the prevailing climatic conditions.

A dosage range is recommended for each stage or size of grass. The lower rates are suggested for ideal conditions when soil moisture is adequate and the grass is growing actively, daily maximum temperatures reach 75° F or higher, humidity is medium to high, and when the grass stand is only moderately thick. Use the higher suggested rates when the grass is retarded or stunted due to dry soil, cool weather, or prolonged cloudiness, the humidity is very low, the daily maximum temperatures range below 75° F, the grass stand is very thick, and when application conditions are not entirely satisfactory.

Use 1-1/3 gallons PROPANIL - 3 (3 to 4 lbs active) per acre on barnyardgrass in the one to early four leaf stage, and for most broadleaf and aquatic weeds. Generally this will be 15 to 25 days after planting of the rice.



Use 1-1/3 to 1-2/3 gallons PROPANIL - 3 (4 to 5 lbs. active) per acre on barnyardgrass in the four to five leaf and early tillering stage. Generally this will be 20 to 30 days after planting of the rice.

HUMIDITY—Maximum uptake of PROPANIL - 3 occurs during periods of high humidity and may virtually cease when humidity is very low. A significant amount of spray may evaporate in the air during application at low humidity. Increase the total spray gallonage per acre when applications must be made at low to moderate humidity. Do not apply PROPANIL - 3 at any time when the humidity is extremely low.

TIME OF SPRAYING—Successful applications of PROPANIL - 3 have been made at any time of the day when wind and atmospheric conditions have remained favorable. However, early morning or occasionally late evening application is usually preferable, when winds are generally at a lower velocity, the air is less turbulent and the humidity is higher. If spraying in the late morning or afternoon is necessary when conditions are not entirely favorable, increased gallonage, higher dosage and compensating adjustments in sprayer operation are necessary.

COMPATIBILITY WITH INSECTICIDES—Severe injury or death of rice plants may result from combination or separate sprays of PROPANIL - 3 and certain insecticides. Do not combine PROPANIL - 3 with Sevin (carbaryl) or any organic phosphate insecticides such as parathion, methyl parathion, Guthion, malathion, Systox, EPN, Phosphamidon, etc. Do not apply any of the above insecticides to rice fields within 14 days before or after PROPANIL - 3. Do not use systemic phosphate insecticides as Disyston, Thimet, etc. on rice fields to be treated with PROPANIL - 3.

Most chlorinated hydrocarbon insecticides such as DDT, toxaphene, aldrin, dieldrin, endrin and heptachlor may be used with PROPANIL 3 in separate sprays or as seed treatments. Combination sprays may cause some temporary tip burn.

Do not mix PROPANIL - 3 with liquid fertilizers for combination application.

APPLICATION

EQUIPMENT—Use aerial or ground sprayers. Flush with clear water after each day's use. Clean all equipment used for PROPANIL 3 with a detergent wash followed by a water rinse, before and after spraying other pesticides or other crops. Applicators and flagmen should avoid contact with spray mist from PROPANIL 3 or any pesticides and should wear protective clothing and goggles. Wash thoroughly after exposure.

AIRCRAFT—Fixed wing aircraft or helicopters should have well designed spray systems that produce a uniform pattern of medium fine spray droplets. Apply PROPANIL - 3 on small grass in no less than 10 gallons per acre with boom-nozzle or "Swathmaster" sprayers. Increase to 12 to 15 gallons per acre for larger or thicker grass or during periods of low humidity. Somewhat lower gallonage rates are possible with the "Micronair Rotary Atomiser" sprayer.

Swath width varies with the aircraft but should be uniform without streaks or skips. Measure swaths accurately for flagging.

GROUND SPRAYERS—Use standard low pressure herbicide sprayers equipped with boom and flat fan nozzles. Use nozzle sizes that deliver a medium fine droplet in 15 to 40 gallons total spray per acre at 40 to 50 p.s.i. and at ground speeds not in excess of 3 to 4 m.p.h. Avoid raising boom too high. Spray patterns should meet uniformly.

TO AVOID RESIDUES AT HARVEST—DO NO APPLY AFTER THE MID-TILLERING STAGE OF RICE OR LATER THAN THE DAYS AFTER PLANTING SPECIFIED BELOW ACCORDING TO EACH VARIETY OR MATURITY CLASSIFICATION OF THE RICE.

NET CONTENTS **U. S. GALLONS BY WEIGHT**

Rice Maturity Class & Typical Variety	Average Days to Mid-tillering & Date of Last Spray	Max. Single Dosage	Total Dosage Per Season
Early-Belle Patna	28	4.0 lb. active	5 lb. active
Mid-season-NATO	35	4.5 lb. active	5 lb. active
Late-Blue Bonnet	42	5.0 lb. active	6 lb. active

Usually one application is sufficient. If retreatment is necessary because of application error or unfavorable weather, apply as soon as possible. Do not spray later than the mid-tillering date for each variety or exceed the total active PROPANIL - 3 per acre shown in the chart above.

EFFECT OF CULTURAL PRACTICES AND CLIMATIC CONDITIONS

FIELD AND SEEDBED PREPARATION—Fields should be accurately leveled and contoured and have well prepared seedbeds, free of large clods. This encourages uniform and rapid emergence of rice, grass and weeds, and permits better timing of sprays.

WATER MANAGEMENT BEFORE TREATMENT—Drained or dry planted fields should be flushed as often as needed to prevent drying and crusting to encourage a uniform emergence and growth of grass, weeds and rice. Flushing is especially important during periods of low rainfall, drying winds, or high temperature. Flushing a dry field a few days before treatment stimulates the active growth of grass and weeds and makes them more susceptible to PROPANIL - 3. If the field cannot be flushed and the grass has been growing slowly, the higher dosage rate is recommended. Most of the standing water should be off the field at the time of spraying to give full exposure of grass and weeds.

WATER MANAGEMENT AFTER TREATING—Treated fields should always be flooded before a second infestation of grass has a chance to develop beyond the one leaf stage. Flooding may be started in 12 to 24 hours if treatment has been made on actively growing grass under ideal conditions. If the treatment was made on slow growing grass during dry, cool, or cloudy weather, delay flooding until 2 to 5 days afterwards to allow maximum time for absorption and translocation.

Do not flush after treatment but cover the grass immediately and completely. Hold flood at desired level. In general, rice can be grown with shallower flooding after PROPANIL - 3 treatment than when water alone is used for grass control.

TEMPERATURE—The activity of PROPANIL - 3 is affected by the daily maximum temperatures a few days before and after treatment. Response improves as daily maximum temperatures increase above 75° F. Response decreases as the daily maximum declines below 75° F. Very poor control may result during periods of extremely low or extremely high temperature. Do not apply PROPANIL - 3 when maximum temperatures have been or are expected to stay below 55° F or to go above 100° F. Low temperature at the time of actual application is not so important as long as it warms up later during the day.

OPERATING CONDITIONS—Steady winds 2 to 6 m.p.h. are preferred, but should not exceed 10 to 12 m.p.h. for aircraft or 6 to 8 m.p.h. for ground equipment. A crosswind is desirable for aerial application. Fields may be treated when grass is either dry or wet with dew; do not spray if rain threatens within 6 hours.

Do not spray when humidity is extremely low, when winds are gusty, when the atmosphere is turbulent, or during periods of temperature inversions or rising thermals.

DRIFT HAZARD TO OTHER CROPS—PROPANIL - 3 injures most crops except cereal grains and perennial grasses. Avoid drift or accidental application from turning aircraft on cotton, soybeans, corn, safflower, seedling legumes, vegetables, orchards, vineyards, gardens, shrubs or ornamentals. Once PROPANIL - 3 is applied it does not release fumes hazardous to nearby crops.

RICE INJURY—All leading commercial varieties of rice are exceptionally tolerant of PROPANIL - 3. A yellowing or tip burn of rice may be noted after treatment, but new growth is normal. Severe leaf burn and stunting of rice may occur when it is weakened by extremely hot weather, soil salts, over-watering, or other causes. Growers are cautioned not to spray at such times.

GRASSES AND WEEDS CONTROLLED WITH PROPANIL - 3

Grasses—PROPANIL - 3 is used primarily for the control of barnyardgrass also known as millet, watergrass, purple or blue stem, or Banner or jungle rice also known as little barnyardgrass or short millet; cockspur; crabgrass; Texas millet, or Colorado grass; paragrass, goosegrass, and Brachiaria.

Broadleaf Weeds—Several broadleaf weeds, commonly pests in rice fields, are also controlled with PROPANIL - 3. These include alligator weed; curly indigo (coffeeweed, bashfulweed); Mexicanweed (bur-weed; Texasweed); redweed (teaweed); redroot pigweed; tall indigo (coffee bean, sennabean); water plantain, and woolly croton (goatweed).

Sedges—Several troublesome sedges are also controlled with PROPANIL - 3. These include hoorahgrass, jointed sedge; nutsedge or coco; spike rush and spearhead (tadpole sedge, horned beakrush).

Effect on Other Species—Perennial species such as cattail, bulrush, paragrass, Johnsongrass, knotgrass, longtom, and others, which develop from well established roots, rhizomes, or corms may be temporarily injured by PROPANIL - 3 but usually recover. Such aquatic species as alligatorweed, Arrowhead lilies and redstem may be injured by PROPANIL - 3 but usually develop in Southern rice fields after the normal time of treatment for barnyardgrass.

Sprangletop and red rice are not controlled with PROPANIL - 3.

Consult State Agricultural Experimental Station or Extension Service Weed Specialists for further recommendations on dosage, timing, water management, and cultural practices to meet local conditions.

WARRANTY NOTICE

Helena Chemical Company warrants that this material has been labeled as required under State and Federal Laws and that they conform to the label description. We make no further warranty expressed or implied.

USDA REG. NO. 5905—68

HELENA

BRAND

PROPANIL 4

CAUTION: KEEP OUT OF REACH OF CHILDREN
SEE SIDE PANEL FOR ADDITIONAL CAUTIONS

SELECTIVE HERBICIDE (4 LBS. ACTIVE* PER GALLON)
FOR POST-EMERGENCE CONTROL OF BARNYARD GRASS AND
OTHER WEEDS IN RICE.

ACTIVE INGREDIENTS:	
*3',4'-Dichloropropionanilide	43.48%
INERT INGREDIENTS	56.52%

*Contains 4 pounds of 3',4' dichloropropionanilide per gallon.

READ "WARNING NOTICE" BEFORE BUYING OR USING.
IF NOTICE TERMS ARE NOT ACCEPTABLE, RETURN AT ONCE UNOPENED.

* Use only according to label instructions.

MANUFACTURED BY
HELENA CHEMICAL COMPANY
West Helena, Ark. — Tampa, Fla. — Lubbock, Texas
Des Moines, Iowa — West Columbia, South Carolina

CAUTION

HARMFUL IF SWALLOWED OR ABSORBED THROUGH SKIN.
CAUSES EYE IRRITATION.
MAY CAUSE SKIN IRRITATION.

Avoid contact with eyes, skin or clothing.
Avoid breathing spray mist.
Keep away from heat, sparks and open flame.
In case of contact: flush skin or eyes with plenty of water for at least 15 minutes; get medical attention.
Do not store near food, fertilizer, seed, insecticides or fungicides.

This product is toxic to fish. Keep out of lakes, streams, or ponds. Do not apply when weather conditions favor drift from areas treated. Do not contaminate water by cleaning of equipment, or disposal of wastes.

GENERAL INFORMATION

HELENA BRAND PROPANIL 4 is a post-emergence herbicide for the control of many grasses and broadleaf weeds in rice fields only. It may be applied by either ground or aerial spray equipment, after dilution and thorough agitation with water. HELENA BRAND PROPANIL 4 is not a hormone-type herbicide but kills susceptible plants by direct contact action. For this reason, thorough spray coverage of weeds to be killed is necessary for best results.

HELENA BRAND PROPANIL 4 should be applied when weeds and grasses are small. (See Directions for Use). Use only on fields which have been drained of flood water.

Rice fields to be treated should be inspected frequently before the application of HELENA BRAND PROPANIL 4 to insure that barnyard or water grass is at the proper stage of growth (1-3 leaf stage with an occasional 4 leaf plant).

WARNING: Never apply HELENA BRAND PROPANIL 4 except as recommended on this label because use in any other way may result in damage or injury to persons, animals, or crops, or other unintended consequences.

DO NOT APPLY HELENA BRAND PROPANIL 4 WITH FOURTEEN DAYS before or after insecticide applications because serious damage to rice may occur.

Do not apply to any crops other than rice.

Before applying HELENA BRAND PROPANIL 4, make sure the spray equipment is properly calibrated to avoid over-or under-treatment.

Do not apply HELENA BRAND PROPANIL 4 under wind conditions which will allow drift to adjacent susceptible crops such as beans, soybeans, cotton, safflower, cucurbits, vegetables, orchards and other sensitive crops. Wind velocity greater than 5 miles per hour will often cause applications to be streaked and give less than maximum herbicidal control.

Keep this container closed when not in use. Do not re-use for other purposes as its toxic contents cannot be entirely removed.

WEEDS CONTROLLED

BARNYARD GRASS (WATERGRASS). Echinochloa crusgalli or Echinochola colonum

ALLIGATOR WEED. Alternanthera philoxeroides—BRACHIARIS. Brachiaria spp. — CRABGRASS. Digitaria sanguinalis — CROTON Croton capitatus — CURLY INDIGO. Aeschynomene virginica — FOXTAIL. setaria spp. — GOOSEGRASS. Eleusine indica — GULF COCKSPUR. Echinochloa crus pavonis — HOORAH GRASS. Fimbristylis miliacea — MEXICAN WEED. Caperonia palustris — PARAGRASS. Panicum purpurascens — PIGWEED. Amaranthus retroflexus — RED WEED (TEAWEED). Melochia corchorifolia — SOUR DOCK. Rumex crispus — SPEARHEAD. Rhynchospora cornuculata — TAIL INDIGO or COFFEE BEAN. Sesbania exaltata — TEXAS MILLET. Panicum texanum — WIREGRASS. Eleocharis spp.

WEEDS NOT CONTROLLED

ARROWHEAD. Sagittaria spp. — BERMUDA. Cynodon dactylon — CATTAIL. Typha latifolia — DUCK SALAD. Heteranthera spp. — JOHNSON GRASS. Sorghum halepense — NUT GRASS. Cyperus spp. — RED RICE. Oryza sativa - SPRANGLETOP. Leptochloa spp.

DIRECTIONS FOR USE — RICE ONLY

Do not use until you have also read the WARNING NOTICE as well as the DIRECTIONS FOR USE on this label.

DO NOT USE, POUR, SPILL OR STORE NEAR HEAT OR OPEN FLAME.

NET CONTENTS U.S. GALLONS

Rice fields should be well prepared and free of large clods to obtain uniform germination of grass and weeds, and to insure uniform flood levels. If necessary, fields may be flushed prior to treatment to produce uniform grass germination. If fields are flushed prior to treatment, flush in sufficient time so that grass and rice are growing vigorously at time of treatment. Water should be drained from fields before spraying so that grasses and weeds are fully exposed to the spray.

HELENA BRAND PROPANIL 4 acts only on grasses and weeds which have already germinated. (Maximum action usually is not apparent until 3 to 5 days after application.) To prevent more weeds from germinating after treatment, fields should be flooded within 24 hours after spraying or as soon as possible after 24 hours. Flooding after spraying will improve the grass after HELENA BRAND PROPANIL 4 treatment.
In cases where flooding of the field would not be completed within seven days or less after application of HELENA BRAND PROPANIL 4, it is best to treat a portion of the field, flood that treated portion and then treat the remainder. This will help to prevent reinfestation of weeds and grasses. Higher rates (4-6 quarts) may be necessary on the remainder since the grass will be more mature.

If the rice is too small to maintain a flood on the field, treatment should be delayed until the rice is large enough. The grass may then be large enough to require 4-6 quarts of HELENA BRAND PROPANIL 4.

Avoid treatment if rain threatens within 6-8 hours or if high winds may cause uneven application or drift.

In case of unseasonably cool weather, higher rates (4-6 quarts/acre) of HELENA BRAND PROPANIL 4 may be necessary.
The number of leaves of barnyard or water grass determines the time and amount of HELENA BRAND PROPANIL 4 to spray, regardless of the size of the rice but before rice in full tiller stage (50 days before harvest).

THE GROWER SHOULD INSPECT FIELDS FREQUENTLY TO DETERMINE PROPER TIME OF APPLICATION. The ideal application time is when most barnyard grass has one to three leaves with only an occasional plant having four leaves. During drought conditions grasses may reach the three leaf stage while still quite short or stunted, so special attention to stage of growth is necessary in these instances to avoid grasses becoming too mature for best results.

Apply 3 quarts of HELENA BRAND PROPANIL 4 per acre when most grass has reached the one to three leaf stage. Use 4 to 6 quarts of HELENA BRAND PROPANIL 4 per acre if grasses are larger, with most in the four to six leaf stage. Mix HELENA BRAND PROPANIL 4 thoroughly with water for spraying, using vigorous mechanical agitation. FOR AERIAL APPLICATION, dilute the proper amount of HELENA BRAND PROPANIL 4 with 10 to 12 gallons of water per acre. Do not exceed 8 pounds per acre per season.

For GROUND APPLICATION EQUIPMENT, dilute the proper amount of HELENA BRAND PROPANIL 4 with 15 to 25 gallons of water per acre.

Lower amounts of water often give inadequate coverage and may cause poor results.

If fields cannot be completely drained so that all of the grass is exposed, a higher dosage of HELENA BRAND PROPANIL 4 (4-6 quarts/acre) must be used.

NOTICE: When HELENA BRAND PROPANIL 4 is applied, especially after the fourth leaf stage of growth of rice, under some conditions, visible leaf injury on rice may result. However, the rice plants quickly outgrow such injury when caused by the later applications.

USE IN CALIFORNIA ONLY — Where rice fields are not completely drained.

NOTE: Before using, read entire label, including WARNING.

To control watergrass, apply HELENA BRAND PROPANIL 4 30 to 45 days after planting, before rice is fully tillered, when watergrass extends 6-8 inches above water surface. If rice has a deep flood, water level may be lowered to 1-4 inches over highest part of field to expose 6-8 inches of watergrass. (When lowering water level, do so slowly to avoid pulling down rice plants). Use 4 quarts per acre if most grass has 3-5 leaves, use 5 quarts if most grass has 5-6 leaves, and use 6 quarts per acre if most grass has 7 or more leaves. Apply in no less than 10-12 gallons of water, using a medium-fine spray.

If higher water level is desired after treating, re-flooding may be started 12 hours after treatment.

NOTICE

Helena Chemical Company warrants that this material conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the Directions for Use and Conditions of Sale, subject to the inherent risks referred to therein. Helena Chemical Company makes no other express or implied warranty, including any other express or implied warranty of FITNESS or of MERCHANTABILITY, and no agent of Helena Chemical Company is authorized to do so except in writing with a specific reference to this warranty. Any damages arising from a breach of this warranty shall be limited to direct damages and not include consequential commercial damages such as loss of profit or value, etc.

DO NOT RE-USE THIS CONTAINER FOR ANY PURPOSE